together anywhere, together anytime

COOPERATION

ICT-214793

TA2

Together Anywhere, Together Anytime

Large Scale Integrating Project

ICT – Networked Media

D1.3 Management of complex collaborative R&D projects – best practices

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Abstract

The main purpose of this deliverable is to identify the challenges involved in the management of complex collaborative R&D projects and to describe some best practices that can help overcome them. The best practices relate to three broad areas, People, Processes, and Results.

TA2 has identified, developed and adopted a number of best practices to deal with the challenges it has recognised. Ten best practices have been selected for this document. These best practices have been gained mainly within the TA2 project.

Target audience

Everybody interested in the management of large international R&D projects.

Impressum

Full project title: Together Anywhere, Together Anytime

Title of the workpackage: WP1: IP Coordination, management and Quality Assurance

Document title: D1.3 Management of complex collaborative R&D projects – best practices

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Executive Summary

The main purpose of this deliverable is to document and reflect challenges and best practices in the management of complex collaborative R&D projects. The best practices presented here have been gained mainly within the TA2 project.

The challenges have been grouped according to the categories People, Processes, and Results. The People challenges include building a project team, communicating effectively, managing diversity, and managing FP7 projects without executive power. In the area of Processes, challenging issues are collaborative decision-making, keeping the project on track, managing resources and administrative requirements as well as envisaging and dealing with risks. Challenges concerning Results include how to achieve high-quality results as well as how to disseminate and exploit your project results.

TA2 has developed a number of best practices to deal with the challenges it has identified. The ten best practices selected as most relevant are:

<u>Best practice 1:</u> Have a well-prepared and -organised kick-off meeting during the first two project weeks in a proper meeting environment and spend enough time of the meeting to allow the team getting to know each other and building mutual trust.

<u>Best practice 2:</u> Establish clear and simple rules for communication within the project.

<u>Best practice 3:</u> Use appropriate tools for communication.

<u>Best practice 4:</u> Separate the role of Project Coordinator and Technical Project Manager in large projects.

<u>Best practice 5:</u> Employ easy-to-use web-based reporting to facilitate the controlling and managing of resources.

<u>Best practice 6:</u> Prepare for typical risks by drafting a contingency plan and make sure that the project management knows of concrete risks as soon as possible.

<u>Best practice 7:</u> Ask the EC to perform their first technical review earlier than the first formal review after year one.

<u>Best practice 8:</u> Establish an Advisory Committee with external experts and stakeholders.

<u>Best practice 9:</u> Use a wide variety of dissemination means in order to continuously get your message across to your target audiences and the broad public.

<u>Best practice 10:</u> Use training for external audiences on project results as an important step to exploitation.

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Abbreviations

BSCW	Basic Support for Collaborative Work (workspace tool)
EC	European Commission
FP7	Seventh Framework Programme of the EU
ICT	Information and Communication Technologies
IP	Integrating Project
IPCC	IP Coordination Committee
PM	Project management
R&D	Research and Development
STREP	Specific Targeted Research Project
TA2	Together Anywhere, Together Anytime (project)

1 Introduction

1.1 Purpose of this document

The main purpose of this deliverable is to document and reflect challenges and best practices in the management of complex collaborative R&D projects. The best practices presented here have been gained mainly within the TA2 project. In some cases we are also referring to best practices that have been presented at the TA2 training seminar on best practices in R&D project management in May 2009 as well as at the TA2 session at the ICT 2008 Event in Lyon, France.

The motivation to document TA2's best practices is twofold: on the one hand, we see it as a knowledge database for the project itself. With the number of participants that you have in an Integrating Project like TA2, it is important to get everybody up to the same knowledge level, when it comes to beneficial project management practices. The process of creating the deliverable itself, has already increased the awareness among the project partners for project management issues, thus improving the understanding and the overall quality of TA2's project management.

On the other hand, TA2 as a project co-financed by the EC also understands its responsibility to share insights gained in the project with the European R&D community in order to spread best practices and contribute to making European research projects more resource-efficient through improved project management practices.

The results presented here are based on the large experience of the partners in the TA2 consortium, but also on the results of the discussion we had at the TA2 seminars in Lyon in autumn 2008 and in Heidelberg in spring 2009.

1.2 Target audience

This deliverable is targeted at anyone interested in the management of large-scale, complex collaborative R&D projects, which includes specifically coordinators and work-package/task leaders of European research projects. Although the best practices referred to in this document originate exclusively from the ICT area in FP7, practically all of the insights presented can be applied within other topical areas of FP7 as well as in other European R&D programmes. As we are focusing on mid- to long-term collaborative R&D projects, the best practices presented in this document are only partially applicable to short-term projects in the area of commercial product-related development.

1.3 Definition of project management

Project management is the discipline of planning, organizing, and managing resources to bring about the successful completion of specific project goals and objectives. It is often closely related to and sometimes conflated with programme management.

A project is a temporary endeavour, having a defined beginning and end (usually constrained by date, but can be by funding or deliverables, undertaken to meet particular goals and objectives, usually to bring about beneficial change or added value. The temporary nature of projects stands in contrast to operations or business as usual, which are repetitive, permanent or semi-permanent functional work to produce products or services. In practice, the management of these two systems is often found to be quite different, and as such requires the development of distinct technical skills and the adoption of separate management.

The primary challenge of project management is to achieve all of the project goals and objectives while honouring the preconceived project constraints. Typical constraints are scope, time, and budget. The secondary—and more ambitious—challenge is to optimize the allocation and integration of inputs necessary to meet pre-defined objectives. (Source: Wikipedia)

1.4 Scope of this deliverable

This deliverable focuses on aspects of project management that are both challenging and specific to collaborative research projects in the 7th Framework Programme. FP7 projects are characterised by geographically dispersed participants, multiple organisational partners, and usually diverse teams of experts. Within FP7 projects, the deliverable will focus on complex large-scale projects, like Integrating Projects (IPs) and larger Specific Targeted Research Projects (STREPs).

Concerning the phases in a project, the document will exclude both the proposal preparation phase before the actual project starts and the exploitation-of-results phase after the end of the project. The latter is described in deliverable D9.4, which is not publicly available.

1.5 Methodology

The methodology of this deliverable is based on the best-practice approach. We define a best practice as a specific method, process or technique for addressing a particular task or issue, which has proven to be more efficient and effective in generating a desired outcome than any other known approach. The best-practice approach applied in this document is purely based on empirical evidence from TA2 and other projects with which Eurescom and other TA2 partners have been involved.

We are aware that the best-practice approach chosen may not lead to scientifically valid results, as limits on time and resources do not allow an analysis of sufficiently large number of practices to unequivocally identify the best possible practice. Thus, the decision, if a practice presented in this document is a best practice, depends mainly on the experience-based judgment of the authors, who all have at least ten years of experience in international project management.

The methodology is in accordance with the purpose of this deliverable, which is building a knowledge base of best practices that helps other projects and TA2 itself in continuously achieving excellence in project management.

Most best practices presented in this document cannot be applied one to one in other projects. In order to get a maximum benefit from a best practice presented here, the best practice should be analysed in terms of its applicability, which might eventually require some modifications and adaptations to make it fully suitable to the other project's specific circumstances.

1.6 How to use this document

This document is meant to be of immediate practical use to those who read it. In order to get most out of the deliverable, we recommend that you first identify in chapter 2 the project management challenges which are currently your major concerns, and then see in chapter 3, if there is a corresponding best practice. After reading the relevant sub-chapters in chapters 2 and 3, you should consider how you could apply the information given to your project and what you might have to do to adapt best practices offered in this deliverable to your specific project situation.

2 Challenges in large collaborative R&D projects

Large collaborative R&D projects involve numerous challenges, due to their complexity and the heterogeneity of the people involved. The list of challenges presented here is by no means exhaustive. We have rather chosen those challenges, which are – based on our experience – particularly important.

In order to group these challenges in a meaningful way, we categorised them into “People”, “Processes”, and “Results”. However, most challenges include aspects that apply not only to one category. Take effective communication, for example. Although this is primarily about the interaction between people, it also implies the communication processes that have been defined in the project.

2.1 People

2.1.1 Building a project team

In practice, the continuous process of building the project begins long before the official start of the project. According to our experience, it may start as early as 1.5 years before the actual start of the project in the case of larger EU projects. When forming your consortium of partners in the proposal writing phase, you are laying a crucial cornerstone of your later project team. Mostly you will start with a core team of a few major partners and extend the core team to a project team as the proposal is taking shape. The challenge is to continuously build a harmonious, high-performing team from day one of the project idea.

The challenge is anything but trivial, as in European projects you usually have a large group of people with different professional and cultural backgrounds, who are most of the time geographically dispersed when they work together. Forging an effective, high performing team under these circumstances is, thus, more challenging than doing the same for a company-internal project, when the degree of heterogeneity and geographical dispersion is usually much lower.

2.1.2 Effective communication

The quality of project-internal communication is directly related to the effectiveness of the project team. The project management challenge is to facilitate effective communication on all levels – from the most senior project decision making unit to the sub-team on a sub-task level. Effective communication will help enable defined tasks and project goals to be achieved with the most effective investment of resources and time and with the minimum confusion ambiguity or duplication of effort. As the people in the project team are a diverse set of individuals, one of the challenges in sustaining effective communication is to build understanding and trust as a basis.

2.1.3 Managing diversity

Large collaborative international projects always deal with people of different cultural and professional backgrounds. This can and probably will lead to frictions. These should be acknowledged and dealt with. When they are managed appropriately, and this won’t be easy, the diversity will become recognized as a virtue and strength of the project. The project management task is to work through each challenge effectively and sensitively, and to be aware that challenges and friction may reveal themselves at many different moments in the project.

2.1.4 Managing projects without executive power

The coordinator and the technical manager of a large collaborative R&D project in FP7 are in a special situation, which is fundamentally different from the situation of a project leader in a company-internal development project. The main difference is that coordinator and technical manager do not have direct managerial control over the personnel in the project who come from other independent organisations. This means that there is no formal authority towards the partner organisations and their employees working in the project. The very limited authority is only based on the commitments made by the partners in the contract with the EC and the consortium agreement. In case an employee of one of the partners is constantly and seriously underperforming, the project management cannot take any disciplinary measures, but can only report the situation to the partner organisation. In case a partner organisation decides that a person working in the project should drop project tasks in favour of other duties, the project management can only try to ask for appropriate replacement.

This relatively low level of power increases the necessity and challenge for the coordinator and the technical manager of a collaborative project to keep everyone motivated to perform their work by ensuring good team spirit and by applying excellent communicational and motivational skills.

2.2 Processes

2.2.1 Collaborative decision-making

Decision-making in a collaborative project can be quite challenging, as all partners might have their own agendas. Furthermore, there is a high necessity for unanimous decisions, if the project shouldn't fall apart. This doesn't so much concern the minor decisions in everyday operations of a project, but rather crucial decisions on, e.g., possible joint exploitation of project results and the definition of fair terms of usage by other partners in the project who don't share ownership of the IPR.

2.2.2 Keeping the project on track

Keeping the project on track means controlling and steering the project towards its goals as well as ensuring that the goals are continuously challenged and, if necessary, adapted as the project progresses. This also includes controlling the consumption of resources in a way that the contractually promised results can be reached within the given deadlines. This is a standard project management task and is not specific to FP7 projects. However, the special character of FP7 project – dispersed participants, size and complexity, limited disciplinary authority of the coordinator/ technical manager, etc. – makes it quite challenging to achieve this goal.

2.2.3 Managing resources

The three main resources to be managed in the project are human resources, i.e. the individual participants in the project and their contractually allocated work effort, financial resources, and time resources, i.e. the labour time and the absolute time available to achieve the objectives of the project. The challenge for the coordinator is to know at any given time in the project, where the project stands in terms of consumed resources, i.e. how much the real consumption deviates from the planned consumption of resources. Based on this permanent controlling, the coordinator needs to be able to detect significant deviations in the resource consumption and initiate corrective action.

2.2.4 Handling the EC's administrative requirements

The European Commission has considerable administrative requirements towards FP7 projects, particularly in regard to reporting. This is absolutely necessary, as the EC has to make sure that the European tax payers' money is spent correctly and effectively.

The EC requires quarterly and annual reports that have to provide a detailed overview on the work that has been done in the reporting period and the resources spent in order to achieve these results. Getting the necessary information together fast enough and putting them into a concise report can be a real challenge for a coordinator of an FP7 project.

2.2.5 Managing change

Most FP7 projects run for two to three years, some even up to four years or longer. A lot of change can and usually will happen in this time. For example: new technological developments that change the context for the project's technological goals, threatening to make some of them obsolete; changes of or in partner organisations, who – depending on their development – might downsize their project involvement or even cancel their participation completely; or key persons leave the project.

So, if there is one certainty in project, then it is that change will happen. The better the project manages change, the less disruption and negative impact will occur in the project. The challenge is that in order to manage change effectively, both preparedness and flexibility are required. The contract with the EC leaves only limited room for fundamental changes, for instance, if a certain new technological development would make it advisable to increase the EC funding, this would not be possible under the EC financial rules.

2.2.6 Envisaging and dealing with risks

Managing risks can be regarded as a special form of change management. In this case, the anticipated change is, per definition negative, and the challenge is to deal with risks without allowing them put the project work off the track.

A number of typical risks can be anticipated, but if and when they materialise is mostly unknown. So the challenge is twofold: first, to have an early-warning system that identifies risks as early as possible, so that if and when they materialise you have time to take the necessary counter-actions; and second, to have contingency plans in place for major risks in order to respond swiftly and effectively, once a risk has materialised.

2.3 Results

2.3.1 Achieving high-quality results

Good people and good processes are already a good basis for achieving high-quality results. However, even if you have good people and processes, excellent results do not come automatically. The challenge for the coordinator/technical manager is to instill an unwavering commitment to excellence in the consortium in order to achieve high-quality results. In addition, it will also be challenging to set up effective project-internal quality management procedures (in addition to the EC reviews) and to ensure that these processes are continuously and strictly applied.

2.3.2 Disseminating information on project results

Dissemination of information on the project results to the right target audiences is crucial for the project's success. Dissemination can be a first step towards successful exploitation of the project results. If none of the key players in a given area knows about the project results, it will be less likely that they will support the exploitation of the project results later.

The challenge for project management is to achieve the most effective dissemination possible, with the constrained resource available within the project. Most participants in a project are experts who are interested in their specific research discipline and are motivated to perform dissemination around their research expertise. A challenge for the project management is to harness and finess the dissemination so that lower level goals can be associated with the large scale goals of the project and to ensure that separately and in a more PR savvy way the goals and successes of the project are made known to as influential an audience as possible.

2.3.3 Exploiting project results

Exploitation of project results should be the ultimate goal of every project. However, doing it can be quite challenging. This depends, of course, on what type of exploitation is meant.

Inputs to standardisation could be seen as both dissemination and exploitation, but in any case standardisation inputs would usually not be a problem.

Real exploitation means in most cases making money with the results and hence bringing them to the market. R&D projects normally finish at a prototype status. Making a commercial product from a prototype requires significant additional investments and financial risks. It is often extremely difficult to find a company willing to take this risk.

It becomes even more tricky, if one or more partners plan to commercially exploit jointly owned results. The challenge is to get any IPR issues out of the way that could block the road towards successful commercial exploitation. Conflicts could emerge between academic and industrial exploitation. For an academic researcher the exploitation goal might be to present project results as a paper at a workshop or conference. Industrial researchers might object to this as they might feel too many IPR-protected confidential results are disclosed to the public and, thus, to their competitors. Industrial research partners would rather prefer a more discreet and more commercial way of exploitation, i.e. the development of a commercial service or product based on the project results. Solving these potential conflicts in exploitation approaches could become a major project management challenge towards the end of the project.

3 Best practices in project management

In this chapter, we have collected 10 best practices from the TA2 project, which are complemented by some other best practices from projects that have been managed by a TA2 partner. We have deliberately chosen the 10 best practices on the basis of whether they are both typical for TA2 and at the same time of general interest. They are in no way exhaustive; and the choice might differ if you ask other projects. However, all the best practices described here are very relevant for good and effective project management.

3.1 Team building

Because of the diversity and geographical distance of the consortium partners, team building is central for a successful project. In TA2 we have employed different methods of turning a group of individuals with different cultures and professional backgrounds into a unified team dedicated to the joint achievement of the project goals.

Team building already starts in the proposal preparation phase, where the cornerstone for a good team will be laid. The choice of partners you have made in the proposal phase and the processes you have already implemented then will have a significant impact on the team performance in the execution phase. Mostly you will start with a core team of a few major partners you know quite well and extend the core team to a project team as the proposal is taking shape.

However, as the proposal phase is outside of the scope of this document, we will focus on the team building within the execution phase. It starts on day 1 of the project. The best practice TA2 can offer in this context sounds simple but is extremely important and often neglected:

Best practice 1: Have a well-prepared and -organised kick-off meeting during the first two project weeks in a proper meeting environment and spend enough time of the meeting to allow the team getting to know each other and building mutual trust.

Figure 1: The TA2 project team at the kick-off meeting 2008

A face-to-face kick-off meeting during the first one or two weeks of the project is absolutely crucial for the success of the project. Not only to agree on the work plan and to get the ball rolling, but also to make the individual partners a real team. Normally some project team members will already know each other, but most will meet for the first time at the kick-off meeting.

It is very important that the meeting is organized well, i.e. the agenda is prepared well in advance to avoid unnecessary ambiguity, the meeting room is set up with a round or u-shaped table so all participants can see each other, and every participant has a clearly visible name tag. Enough time must be allocated for enabling people to talk to each other, e.g. by planning enough breaks, by hosting an informal dinner, or by holding the meeting on a Thursday and Friday and plan some activities on Saturday for the colleagues who are able to stay a day longer. In TA2 we made the experience that colleagues who had a drink together in an informal contact are able to solve problems easier than people who have only met in a formal setting.

We recommend organizing face-to-face project management meetings at least once every three to four months so people can build up their relationships and resolve any issues in personal talks. Apart from this, project managers should encourage technical teams to set up and run technical workshops – co-coding and integration workshops achieve plenty of results that cannot be done with teams working remotely. In between times, regular audio conferences are necessary to monitor and encourage progress.

3.2 Communication management

Effective communication is the basis of success for any project. In large European research projects with diverse and geographically widespread participants, enabling effective communication is a particularly challenging task. TA2 has solved this task through a combination of well-defined communication processes, the creation of an open communication culture, and an efficient technical communication infrastructure.

<u>Best practice 2:</u> Establish clear and simple rules for communication within the project.

There should only be a few rules, but they should be followed by everyone in the project. The basic rule, which has helped to build a trustful communication environment within TA2, is that you should communicate openly and keep everybody who needs to have specific information in the loop. The other rule is that you should make use of the phone and face-to-face meetings as often as possible. Relying too much on e-mail can be a dangerous trap, as some potential misunderstandings might linger on without being resolved. Direct communication helps clarify issues much faster.

Although it sound trivial, it is important for project communication to maintain updated address lists including every project colleague's phone numbers and business address details and make them available to every partner.

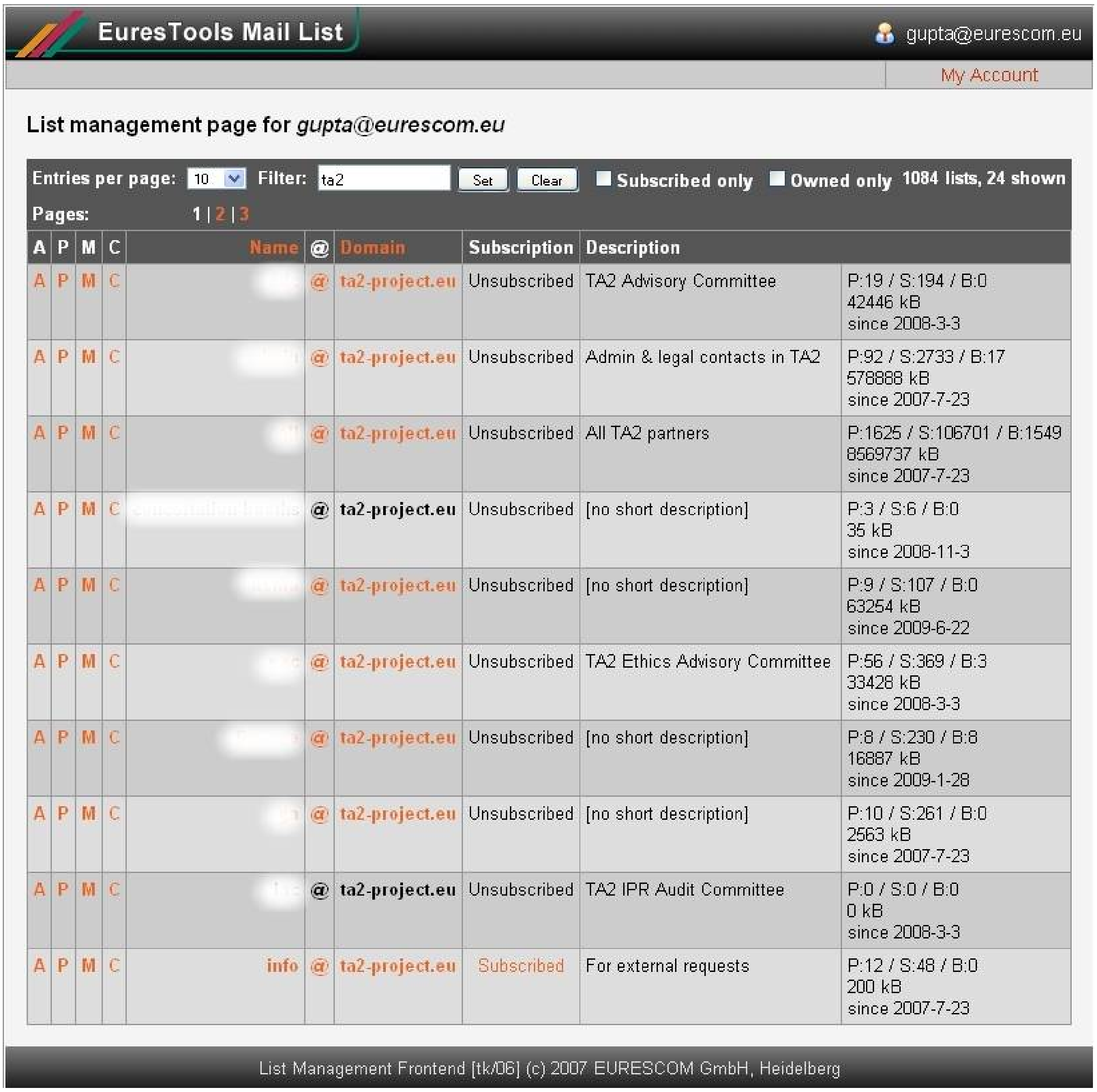
Best practice 3: Use appropriate tools for communication.

TA2 has chosen a small set of communication tools, which effectively support the communication processes within the project.

TA2 holds regular **audio-conferences** within the most senior decision-making units of the overall project as well as on a work package level. These audio-conferences ensure that everybody knows what the status is and they offer the opportunity to discuss issues which require action. The audio-conferences are done via audio conference bridges of the project partner organizations or via EuresTools Audio-Conferencing, which provides several permanent audio-conference bridges that can be used anytime. Via a management interface, everybody can see the schedule of TA2 audio-conferences and those responsible can schedule audio-conferences via this interface.

Figure 2: Screenshot of EuresTools Audio Conferencing

A key tool for TA2's asynchronous communication is the **mailing-list**. The project runs several different lists, which are maintained via EuresTools Mail-List. For nearly all communications though, the general list is used. This is part of the open culture of communication regarded as necessary for successful project management.. In addition to a general internal mailing-list, to which every project participant is subscribed, there are mailing lists for all work packages as well as for special purposes and groups, like, e.g., the IPCC or the reviewers as well as a mailing-list of people who receive and answer external requests. Requirements of TA2, which are fulfilled by the tool, are that messages are secure, lists cannot be spammed by externals, lists can be easily maintained, and finally, but very importantly, that the tool offers an archiving function. To avoid partners having to read too many e-mails, we use clear indications in the subject line, e.g. "Workpackage 3 for information …" or "Workpackage 1 for action …".


EuresTools Mail List

gupta@eurescom.eu

My Account

List management page for *gupta@eurescom.eu*

Entries per page: 10 Filter: ta2 Set Clear Subscribed only Owned only 1084 lists, 24 shown

Pages: 1 | 2 | 3

A	P	M	C	Name	@	Domain	Subscription	Description	
A	P	M	C	[illegible]	@	ta2-project.eu	Unsubscribed	TA2 Advisory Committee	P:19 / S:194 / B:0 42446 kB since 2008-3-3
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A	P	M	C	info	@	ta2-project.eu	Subscribed	For external requests	P:12 / S:48 / B:0 200 kB since 2007-7-23

List Management Frontend [tk/06] (c) 2007 EURESCOM GmbH, Heidelberg

Figure 3: Screenshot of EuresTools Mail List

An important communication rule in regard to e-mail is that by default no attachments should be sent. Documents should be rather stored in the web-based workspace and then be linked in the e-mail, if needed. TA2 uses the collaborative online tool BSCW (Basic Support for Collaborative Work – http://public.bscw.de). Using BSCW instead of e-mail attachments also solves the issue of version control of documents.

Although there are other tools available, which could be used – e.g. instant messaging or web conferencing – TA2 decided to keep things as simple as possible in order to avoid that project participants get overwhelmed by too many communication channels.

3.3 Project structure

It is important to have a clear project structure with clearly defined work packages and tasks, and with clear relationships.

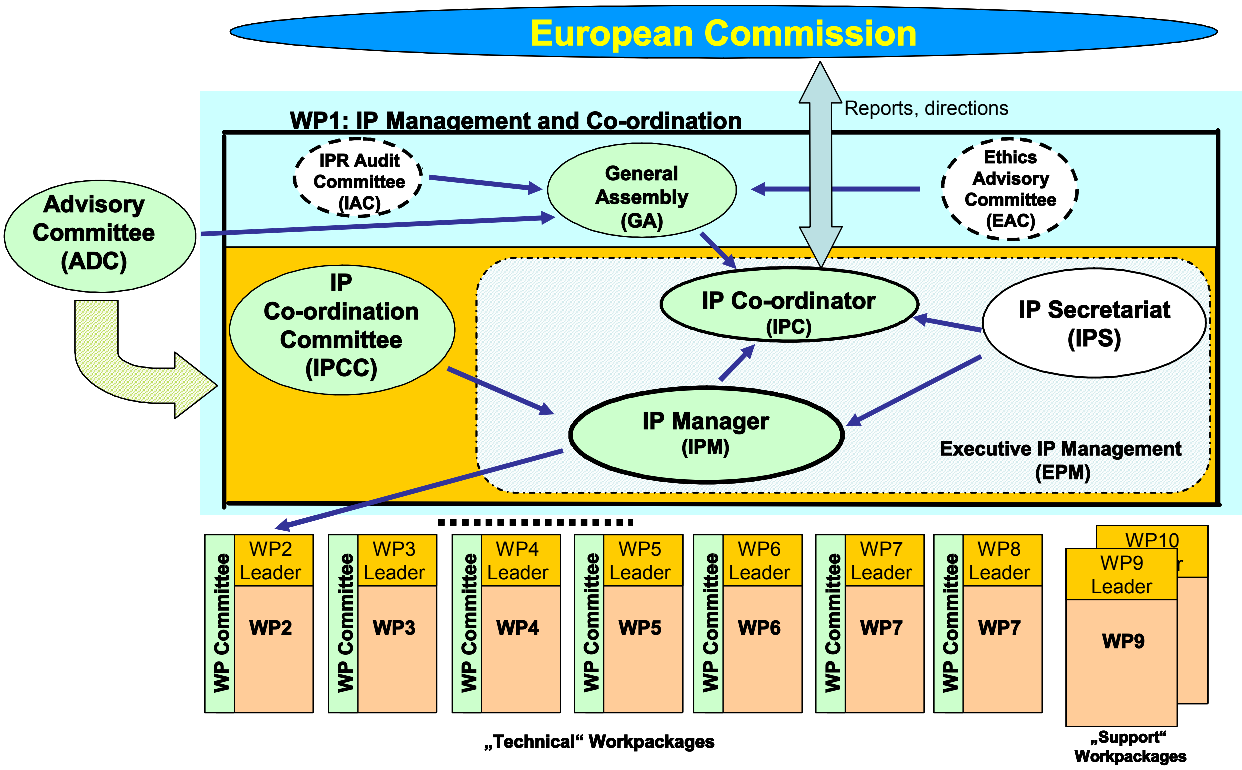

Figure 4: TA2 project structure diagram

On the day-to-day project management separation between technical and administrative coordination is recommended. It requires different skills and if we count the required person-power for coordination tasks, it is easy to understand that one single person is not enough for larger projects.

Best practice 4: Separate the role of Project Coordinator and Technical Project Manager in large projects.

TA2 has split the role of Project Coordinator and Technical Project Manager, mainly because it requires different skills. The experiences with this split are excellent.

The **Project Coordinator** has mainly to communicate with the European Commission, ensure proper reporting, control resources and budgets, handle payments to partners, control milestones and deliverable schedule. The **Technical Project Manager** has mainly to coordinate technical work, ensure technical results, handle technical problems, and maintain the quality of technical results.

One of the potential dangers of splitting these roles is that there is a team of roughly hierarchically similar persons, whose responsibilities could be overlapping. It is crucial that these persons have a very good personal relationship, work together very well and not begrudge the other’s success in his/her role.

3.4 Resource management

Effective resource management is of high importance for any project. In FP7 the importance is even higher, as the funding rules make it impossible to get any additional financial resources. Resources to be managed are person months, financial funds, and the available time to spend both of them. In large complex projects like TA2, keeping the overview on resources is challenging. Reporting in FP7 has, apart from its internal controlling role, the role of populating formal reports towards the European Commission. The use of resource is reported to the EC in quarterly and annual management reports.

In order to be able to deliver this, a project needs to first capture the information. In order to achieve this, TA2 has a resource management and resource controlling based on clear processes, which are supported by a web-based reporting tool called EuresTools Reporter.

<u>Best practice 5:</u> Employ easy-to-use web-based reporting to facilitate the controlling and managing of resources.

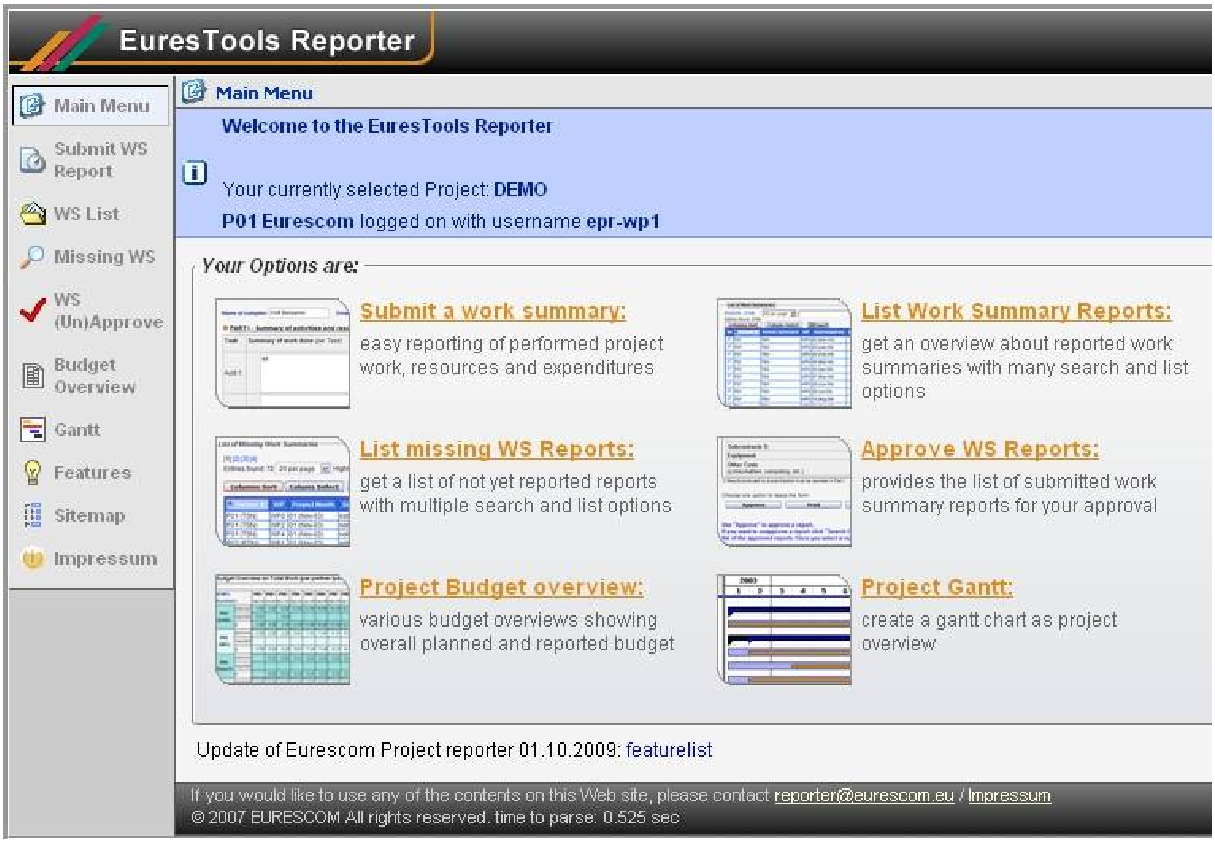

Figure 5: Screenshot of EuresTools Reporter

The main practical difficulty in managing resources is to get the information on resource consumption in a timely and accurate fashion. Most project partners perceive reporting as an administrative burden. In order to get their input, reporting has to be fast and easy, otherwise the completion rate of reports will drop. TA2's solution is pragmatic: process-wise, the reporting of work done and person months and money spent is done quarterly, which is in line with the EC reporting requirements. Other projects prefer monthly reporting, which has the advantage of giving the coordinator and the technical manager a much more up-to-date picture on resource consumption. However, experience shows that such frequent reporting leads to an erosion of reporting discipline.

In terms of the technology used for reporting in TA2, the EuresTools Reporter fully meets the requirements for fast and accurate reporting. The time a partner needs to fill out a work report is relatively short, usually between 5 and 15 minutes. Those who still forget to report on time receive first automated e-mail reminders and finally a reminder by the responsible work package leader.

The reporting tool allows the data to be exported in a format compatible to the EC requirements. It also offers the monitoring of the delta between planned and reported figures. This helps to identify potential resource issue early enough for corrective action.

3.5 Risk management

A four-year research project like TA2 is exposed to a number of risks including technical risks, resource risks, and economic risks. Most of these risks are generally known, although you never know in advance, if, when and how specifically they will materialise. Knowing the general types of risks allows to set up a **contingency plan**, which TA2 did (D1.1, chapter 1.6 – non-public deliverable).

Best practice 6: Prepare for typical risks by drafting a contingency plan and make sure that the project management knows of concrete risks as soon as possible.

The risks covered in TA2's contingency plan include:

- A partner is seriously underperforming, affecting the whole project.
- The project is delayed through underperforming partners.
- Individuals retire or change jobs.
- Departments involved in the project are reorganised and cannot participate any more.
- Whole partner organisations disappear from marketplace.

Let us look at one example to see how TA2's contingency plan prepares for risks.

Example: a partner leaves the project

An important risk is, for example, if a partner leaves the project. So, what should be done if this happens? The contingency plan can only assume potential risks and answer them in the way of "what would I do if…". In the end, a project has to deal with the concrete problem when it occurs, which is in most cases different from what has been foreseen in the contingency plan. Good project management is really important, if such cases happen. One of the most important issues is to know of the risk as soon as possible. Again, mutual trust within the project team helps that partners inform the coordinator as early as possible if such things occur.

As a solution for the situation when a partner or an important participant is no longer available, work items could be taken over by other partners if this is possible. However, work is often difficult to re-distribute and must often be kept in one task. Thus, adding a new partner to the project could be a possibility to be considered. Our experience in TA2 is that it is often not so difficult to find new partners. Many organisations are really interested to participate in international R&D projects.

Replacements happen often at universities, because they have a particularly high turnover. If an individual project colleague changes to a different university, it is probably the best solution to change the partner from the old to the new university.

3.6 Quality management

For large collaborative projects quality assurance is very important. For FP7 projects the EC performs regular and irregular reviews and audits to ensure that their projects achieve the results they promised and that the results are relevant for Europe. Audits and reviews of the results of an Integrating Projects (IP) are required to ensure and maintain maximum efficiency of the IP, maximum quality of the results, and to keep the IP focused on the relevant objectives. They also ensure proper work execution according to the terms of the Grant and Consortium Agreements, and promote the dissemination and exploitation of the results.

In addition to the EC audits, the project needs to take quality assurance measures to guarantee a high quality of the results. Those quality assurance measures are on the project and deliverable level, and on the working level. On the project and deliverable level, TA2 has introduced internal and external reviews of results and case-by-case self-assessments. On the working level, quality assurance includes control of changes made to hardware, software, firmware, documentation, tests, test fixtures, and test documentations. Those quality measures are part of the "technical" project documentation, and described in the related deliverables. One of the tools TA2 is using for this purpose is a Wiki.

Other measures to make partners do better work are to enforce good reporting, in particular of work done and any problems, and to monitor whether it is done correctly. If project participants are underperforming, Coordinator, Technical Manager and/or Workpackage Leader have to start remedial actions in order to bring performance to a satisfactory level. It is important to ensure proper working of this methodology at a very early stage of the project.

A solution to the problem of an underperforming partner could be to give underperforming partners less money, though in the first instance we would advise trying to make the gap between 'current performance' and 'expected performance' very clear and to help the partner improve. If this approach fails, then as you revisit the budget planning it would be wise to minimize your dependence upon a poorly performing partner by transferring key tasks to other partners with an appropriate redistribution of the proposed budget allocation for the remaining project period.

Best practice 7: Ask the EC to perform their first technical review earlier than the first formal review after year one.

The first scheduled formal review performed by the Commission is after the first project year. This is, in most cases, too late to change the project's directions significantly. Therefore it is recommended to try to have a Commission review at an earlier stage, e.g. after moth 6, as TA2 successfully did. This has the advantages that at the first formal annual review, the reviewers are already familiar with the project and the project gets feedback from the reviewers at an early stage, early enough to still change directions.

Best practice 8: Establish an Advisory Committee with external experts and stakeholders.

TA2 has a very good experience with an Advisory Committee consisting of about ten high profile industry and academia external representatives from the relevant topical area. The Advisory Committee advises the project on its scientific direction and on business opportunities. It reviews on a regular, i.e. yearly, basis the progress made and gives advice on the scientific and business aspects. This advice could, for instance, include new academic or technological achievements the project should consider, new important trends, new societal developments the project should take into account, concrete proposals on how new business may be generated and how exploitation should be organised from the project results. The Advisory Committee should meets regularly, e.g. once a year, or upon specific request by the project and keep in contact electronically between the meetings.

3.7 Dissemination of project results

The dissemination of project results has high significance for any publicly funded project. Although very different from exploitation, dissemination is an important step towards successful exploitation of project results.

TA2 uses various means for disseminating its results, including:

Public project website. The website ensures that all interested parties are informed about the project and its progress, and can access the publicly available results of the TA2 project. URL: http://www.ta2-project.eu

Figure 6: Screenshot of the TA2 website

Presentations at conferences and to FP7 activities. TA2 results are being presented at targeted international and regional conferences and also to related other FP7 activities. Representatives of TA2 are very active in the EU Future Internet and networked media related concertation activities.

Articles in targeted books, magazines, journals etc. TA2 is submitting articles to targeted international magazines and other appropriate publications.

Newsletter. The annual electronic newsletter contains, in an easy-to-read format, the latest news and results from the project. The newsletter is published via the TA2 website and is sent electronically to a targeted audience. See http://www.ta2-project.eu/newsletters/newsletters.html

Targeted media and publicity activities. The project will conduct a series of press releases, and distribute brochures and other PR material.

Information activities within the TA2 partner organisations. TA2 partners have to inform their senior managers about TA2, its progress and its benefits. This acts as a catalyst for disseminating TA2 results. It also helps to keep the focus of TA2 concerning business, dissemination and exploitation.

TA2 address databases. These databases contain addresses of potential and targeted users of TA2 results. They are used for targeted dissemination of results, deliverables, seminar invitations, and the electronic project newsletters.

Advisory Committee as catalysts. The Advisory Committee includes invited representatives from related industries, research and commercial organisations. This committee acts inter alia as a catalyst to spread the results and recommendations to wider communities.

Concept demonstrators shown to real audiences. TA2 will develop 5 experimental concept demonstrators which will all be evaluated using real users. Some of these demonstrators, where copyright and license restrictions allow, will be used to generate wider media interest through which a wider public audience can be made aware of the work of TA2.

Best practice 9: Use a wide variety of dissemination means in order to continuously get your message across to your target audiences and the broad public.

3.8 Training as entry point to exploitation

In TA2, training plays a central role. The training activities for external target audiences on TA2 project results are an essential means for the validation and dissemination of results as well as for preparing the ground for their exploitation.

Best practice 10: Use training for external audiences on project results as an important step to exploitation.

Through such training, TA2 will initiate viral marketing effects, leading to potential future customers knowing and appreciating the project results. The coordinator and technical manager of TA2 have already enjoyed very positive experiences with this type of training-induced exploitation in the FP6 Integrating Project NM2 (New Media for the New Millennium – http://www.ist-nm2.org).

The external training on project results is based on a reusable training kit that contains detailed material for both trainers and trainees. Using this training kit, TA2 partners will organise training workshops at different locations, e.g. as summer schools. At these training workshop, external participants will acquire a deep knowledge of the project results, which is likely to make some of them want to use them later on.

At TA2, we regard the training workshops not as isolated events, but as the beginning of a relationship with potential users of the technological solutions developed in the project. Thus, TA2 is planning to create a Web community of users of the project results, which will include training participants as well as others interested in the project results. From the positive experiences gained in NM2, the TA2 consortium is confident that such a Web community will last beyond the lifetime of the project, which will be a perfect basis for further commercial exploitation of results.

4 Summary and conclusion

Ten best practices have been identified that can help meet the challenges created within large-scale integrating research projects which are characterized through having people from diverse cultures, skills and experiences work together. The challenges have been framed against three coordinates, People, Processes and Results. The ten best practices that have been identified include:

1. Have a well-prepared and -organised kick-off meeting during the first two project weeks in a proper meeting environment and spend enough time of the meeting to allow the team getting to know each other and building mutual trust.
2. Establish clear and simple rules for communication within the project.
3. Use appropriate tools for communication.
4. Separate the role of Project Coordinator and Technical Project Manager in large projects.
5. Employ easy-to-use web-based reporting to facilitate the controlling and managing of resources.
6. Prepare for typical risks by drafting a contingency plan and make sure that the Project management knows of concrete risks as soon as possible.
7. Ask the EC to perform their first technical review earlier than the first formal review after year one.
8. Establish an Advisory Committee with external experts and stakeholders.
9. Use a wide variety of dissemination means in order to continuously get your message across to your target audiences and the broad public.
10. Use training for external audiences on project results as an important step to exploitation.

These ten best practices have emerged as particularly important for the success of the TA2 project. However, they should also be highly relevant to large-scale integrating research projects. We encourage other European research projects to consider and adapt those of our best practices, which they have not used before. Reviewing your management processes, as we did in TA2 for preparing this document, can in itself be productive and help to manage large-scale international research projects more efficiently and effectively.

